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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/827,046	04/05/2001	Joseph V. Bak	2941	3455

27377 7590 03/27/2003

MACMILLAN, SOBANSKI & TODD, LLC
ONE MARITIME PLAZA-FOURTH FLOOR
720 WATER STREET
TOLEDO, OH 43604

EXAMINER

PITTMAN, ZIDIA T

ART UNIT 1725 PAPER NUMBER

DATE MAILED: 03/27/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicant No.	Applicant(s)
	09/827,046	BAK ET AL.
	Examiner Zidia Pittman	Art Unit 1725

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 05 March 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) 18-30 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-17 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. _____.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892): 4) Interview Summary (PTO-413) Paper No(s). _____.

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I (claims 1-17) in Paper No. 7 is acknowledged. Claims 18-30 have been withdrawn from consideration pursuant 37 CFR 1.142(b) as being drawn to the nonelected Group II.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Woodward (USPN 5,284,288).

Woodward teaches a method of making a tool for molding a part, the method comprising providing a plurality of tool section in an unhardened state, each of a number of the tool sections having at least one of a groove in a surface thereof and a hole therethrough, assembling the tool sections with surfaces thereof in facing relationship to form a tool block wherein the grooves and holes form at least one channel in the tool block, forming the tool sections so that they assume the shape of a tool when assembled, and diffusion bonding the facing surfaces (Figs. 1 & 2; col. 3, l. 26-29; col. 3, l. 56- col. 4, l. 7). The facing surfaces of the tool sections have complementary grooves, are assembled with the grooves in facing relationship to form a channel, are planar and opposing surfaces of each tool section are parallel. Each

groove has a predetermined cross-sectional configuration that provides the channel with a predetermined cross-sectional configuration after the bonding step (Figs. 1 & 2; col. 3, l. 26-29; col. 3, l. 56- col. 4, l. 34). The tool includes at least three tool sections, at least one of which has grooves in two opposing surfaces and at least one groove in the tool section is in fluid communication with at least one hole through an adjacent tool section (Figs. 1 & 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 10-14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weaver (USPN 5,031,483) in view of Chicco (*Diffusion Bonding of AISI P20 Tool Steel*).

Weaver teaches a method of making a tool for molding a part, the method comprising providing a plurality of tool section in an unhardened state, each of a number of the tool sections having at least one of a groove in a surface thereof and a hole therethrough, assembling the tool sections with surfaces thereof in facing relationship to form a tool block wherein the grooves and holes form at least one channel in the tool block, forming the tool sections so that they assume the shape of a tool when assembled, and bonding the facing surfaces by well known means such as adhesives, brazing, welding, and mechanical fasteners (Figs. 1-3 & 9; col. 4, l. 54 – col. 5, l. 3; col. 7, l. 5-10). The facing surfaces of the tool sections have complementary grooves, are assembled with the grooves in facing relationship to form a channel, are planar and opposing surfaces of each tool section are parallel. Each groove has a predetermined cross-sectional configuration that provides the channel with a predetermined cross-sectional configuration after the bonding step (Figs. 1-3 & 9; col. 5, l. 12-23). The tool includes at least three tool sections, at least one of which has grooves in two opposing surfaces and at least one groove in the tool section is in fluid

communication with at least one hole through an adjacent tool section (Fig. 9; col. 4, l. 68 – col. 5, l. 3).

Weaver also teaches a method of making a tool for molding a part, the method comprising cutting a body of tool material in an annealed state into layers with opposing surfaces, forming in each of a number of the layers at least one of a groove in a surface and a hole therethrough, assembling the layers in facing relationship so that the grooves and holes form at least one channel in the assembled layers, bonding the facing surfaces of the adjacent layers, and machining the bonded layers to form a tool with a predetermined configuration relative to the channel (Figs. 1-3 & 9; col. 4, l. 54 – col. 5, l. 3; col. 7, l. 5-10; col. 6, l. 1-27). The facing surfaces include indexing means including holes formed in the block before cutting it into layers, the layers being cut so that each layer includes at least two indexing holes, and the layers are assembled by aligning the indexing holes (Figs. 1-3 & 9).

Weaver does not teach a method of making a tool including diffusion bonding the facing surfaces and heating and cooling the diffusion bonded tool.

Chicco teaches that diffusion bonding (or welding) is a solid-state bonding process wherein coalescence of contacting surfaces is produced with minimum macroscopic deformation by diffusion-controlled processes that are induced by applying heat and pressure for a finite time interval (pg. 105, ¶ 1, l. 1-6). The diffusion bonding of materials is a long-established process. High bond strength, microstructural integrity, low distortion, the capability to join dissimilar materials and the feasibility of fabricating a large number of joints are among the advantages (pg. 105, ¶ 4, l. 1-7). Other

advantages include reduced time and cost of manufacture, composite structure, and increased design flexibility, particularly in the placement and machining of complex cooling channels (pg. 105, ¶ 5, l. 6-12). A specific cooling is also applied (pg. 106, ¶ 6, l. 1-33).

Both Weaver and Chicco disclose material that can be utilized in making tools (see Weaver: col. 1, l. 11-19; Chicco: abstract)

At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Weaver with the teachings of Chicco in order to produce a tool with high bond strength, microstructural integrity and low distortion while reducing time and cost of manufacturing.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodward (USPN 5,284,288) in view of Demaray et al (USPN 6,199,259).

Woodward teaches all the limitations of claims 7-9 as recited above for claim 1, including the teaching of controlling the atmosphere, pressure and temperature to provide a bond between the tool sections (col. 4, l. 35-50). Woodward does not teach the step of grinding and polishing the facing surfaces of the adjacent tool sections to a predetermined surface finish prior to the diffusion bonding step, and wherein the predetermined surface finish is controlled to provide a bond between the tool sections that includes imperfections.

Demaray et al teaches a method of diffusion bonding titanium materials including grinding and polishing the facing surfaces prior to bonding in order to provide an exceptional leak tight seal (col. 6, l. 35-55).

Both Woodward and Demaray et al disclose diffusion bonding of titanium materials (see Woodward: col. 3, l. 26-28; col. 6, l. 56-58; Demaray et al: col. 6, l. 35-55).

At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Woodward with the teachings of Demaray et al in order to provide an exceptional leak tight seal between bonding surfaces.

Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodward (USPN 5,284,288) in view of Weaver (USPN 5,031,483).

Woodward teaches all the limitations of claims 12-17 as recited above, including forming in each of a number of the layers at least one of a groove in a surface and a hole therethrough, assembling the layers in facing relationship so that the grooves and holes form at least one channel in the assembled layers, bonding the facing surfaces of the adjacent layers, and machining the bonded layers to form a tool with a predetermined configuration relative to the channel. The facing surfaces include indexing means including holes formed in the block and the layers are assembled by aligning the indexing holes. The material of the assembled sheets is titanium (Figs. 1 & 2; col. 3, l. 26-29; col. 3, l. 56- col. 4, l. 34; col. 6, l. 56-58). Woodward does not teach cutting a body of tool material in an annealed state into layers with opposing surfaces.

Weaver teaches a method of making a tool for molding a part, the method comprising cutting a body of tool material in an annealed state into layers with opposing surfaces, forming in each of a number of the layers at least one of a groove in a surface and a hole therethrough, assembling the layers in facing relationship so that the

grooves and holes form at least one channel in the assembled layers, bonding the facing surfaces of the adjacent layers, and machining the bonded layers to form a tool with a predetermined configuration relative to the channel (Figs. 1-3 & 9; col. 4, l. 54 – col. 5, l. 3; col. 7, l. 5-10; col. 6, l. 1-27). The facing surfaces include indexing means including holes formed in the block before cutting it into layers, the layers being cut so that each layer includes at least two indexing holes, and the layers are assembled by aligning the indexing holes (Figs. 1-3 & 9). Molds (tools) are primarily produced from solid blocks of material (col. 2, l. 7-26)

Both Woodward and Weaver disclose materials assembled and bonded together in order to form a tool (see Woodward: Figs. 1-3; Weaver: Figs. 1 & 2).

At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Woodward with the teachings of Weaver in order to provide the sheets for assembly by conventional means to require a minimum amount of machining, and to provide an improved manufacturing process.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Buldhaupt et al (USPN 6,508,394), Milburn (USPN 6,264,091), Douglas (USPN 5,484,977), Boardman et al (USPN 5,385,204), Bottomley et al (USPN 5,330,093), Cooper et al (USPN 5,069,383), Stover et al (USPN 5,009,359), Levin et al (USPN 4,612,066), and Elrod (USPN 4,263,375) are cited as of interest.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zidia Pittman whose telephone number is (703) 305-1248. The examiner can normally be reached on Monday – Thursday and alternate Fridays from 8:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn, can be reached at (703) 308-3318. The official fax phone number for the organization where this application or proceeding is assigned is (703) 305-7718. The unofficial fax number for art unit 1725 is (703) 305-6078.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

37P
03/20/03

Tom Dunn
TOM DUNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700